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FEATURES OF INTERVENTIONAL TREATMENT OF ACUTE MYOCARDIAL INFARCTION WITHOUT ST SEGMENT ELEVATION

321.03 – CARDIOLOGY

Summary of Ph.D. Thesis in Medical Sciences

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The Ph.D. thesis and the summary can be consulted at the library of "N. Testemitanu" State University of Medicine and Pharmacy and on the ANACEC website. The summary submitted on 14.01.2022.

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1.CONCEPTUAL RESEARCH ITEMS

Actuality of research topic. According to World Health Organization data, every year nearly 18 million people suffer from cardiovascular problems, which are the main cause of death in developing countries and constitute 31% in the overall mortality structure **[1]**. The highest proportion of cardiovascular mortality is asigned to acute coronary syndrom (SCA). The incidence of acute coronary syndrome without ST segment elevation (NST-SCA) is considerably more prevalent than that of acute coronary ST segment elevation syndrome (ST-SCA) (55 cases vs. 15 cases per 10000 inhabitants) **[2]**.

Although in-hospital mortality of patients with acute myocardial infarction without ST-segment elevation (NSTEMI) is lower than that of patients with acute myocardial infarction with ST-segment elevation (STEMI) (5% vs. 7%), the long-term estimated mortality in NSTEMI is higher **[3]**.

Of a great importance is an adequate and timely treatment for acute myocardial infarction without ST-segment elevation in reducing overall mortality and disability both globally and particularily in the Republic of Moldova.

Multiple randomized clinical trials and meta-analyzes have been demonstrated the superiority of the routine application of the invasive management strategy of NSTE-SCA over the selective application by decreasing the risk of death, as well as decreasing the number of repeated myocardial infarction, and the number of hospitalizations due to angina pectoris and repeated revascularizations **[4, 5, 6]**.

Risks stratification by applying the criteria stipulated by the European Society of Cardiology (ESC), as wells as scores like GRACE (Global Registry of Acute Coronary Events), or TIMI (Thrombolysis in Myocardial Infarction) and other instruments is essential for choosing the optimal time window for implementing the strategy of invasive management.

The current recommendations for the treatment of patients in the first 2 and 24 hours, considered in a group of very high and high risk, are based on large randomized clinical trials that have specifically investigated this issue **[7, 8, 9]**. And the current clinical practice has recorded a more favorable evolution of these patients in case of compliance with the recommended time windows.

The clinical evolution of patients categorized as in intermediate and small risk groups ensure enough time to select the optimal therapeutic strategy. It is well known and demonstrated

that emergency performed interventions have a higher rate of complications and less successful results than programed ones. The present research was conducted during 2015-2019 and was based on 2015 ESC Guidelline. This work amphasize and recommends the application of the invasive strategy in the first 72 hours of stabilizing the diagnosis of NSTE-SCA. In the condition of inaccessibility of coronary angiography performed in the specified time window, it is recommended to transfer patients to a center with interventional cardiology within **[10]**.

This recommendation is based on two large meta-analyzes the aim of which and subsequently demonstrated result was the the concept of superiority of the routine invasive strategy over the optimal drug treatment and the selectively applied invasive strategy **[5, 4]**. Untill now, there was not yet perfoemed any randomized clinical trials to compare the benefits of invasive strategy applied in the first 72 hours associated with optimal medical treatment and coronary angiography with eventually angioplasty in patients with intermediate or low risk NSTEMI.

According to many researches, both the anatomy and morphopathological structure of coronary heart disease, especially the target lesion in patients with NSTEMI has a high variability. Moreover, both the structure and the consistency of the atherosclerotic plaque that causes acute coronary syndrome vary throughout the course of the disease **[11,12]**.

Over 80% of patients with acute coronary syndrome without ST-segment elevation are supposed to percutaneous myocardial revascularization (10-15% - drug treatment, 5-10% - aorto-coronary bypass) **[13]**. Due to interventional cardiology development, there is observed a clear trend of decreasing the rate of patients to whom surgical treatment is applied and increasing rate of percutaneous vascular interventions cases. There are multiple interventional techniques used in the treatment of patients with acute coronary syndrome, and in case of considering the variability of anatomomorphological conditions during the evolution of the disease, each case requires the selection of the specific treatment technique. Also, it is constating a rising of applicability of the intracoronary imaging and functional diagnostic methods, such as optical coherence tomography, intracoronary ultrasonography and estimation of fractional flow reserve. Nowadays, this direction of research is still poor studied and not sufficiently reflected in the literature of speciality.

Among patients with coronary injury that require increased attention and a specific therapeutic approach are those with diabetes mellitus (DM) considered as a basic disease. The presence of diabetes mellitus is an independent factor that assigns an overlapping risk to patients

with SCA. The incidence of type 2 diabetes in patients who developed acute coronary syndrome is 37.6% according to the data published the researches in Beijing, China, and is approximately equal in patients who presented with or without ST-segment elevation (36.8 vs. 39.0%) **[14]**.

Diabetes mellitus has a direct impact on the mortality of patients with acute coronary syndrome. Percutaneous myocardial reperfusion clearly improves the prognosis of the disease and significantly reduces mortality index even if the estimated death rate of patients with diabetes mellitus at 1 year after SCA reaches 7.2% **[15]**, as well as in non-diabetic patients. The anatomical-morphological pattern of coronary lesions in patients with diabetes is distinguished as a rule by its severity and more massive spread, which in turn influences the impact of myocardial revascularization. Thus, for the success of an adequate reperfusion, the decrease of the complication rate and the improvement of the long-term prognosis is necessary the individualized interventional approach **[16]**.

According to written above, we have planned to carry out a study for which we have formulated the following **purpose**:

Delayed revascularization (> 72 hours) feasibility assessment in patients with intermediate and low risk NSTEMI and highlighting clinical, anatomical, morphological and technical factors that may influence the post-procedural evolution at a distance of 6 months.

In order to achieve the formulated above purpose, we set the following **study objectives**:

1. Estimation of revascularization efficacy performed in term less than 72 hours vs. that performed after 72 hours - 30 days in patients with intermediate and minor risk NSTEMI related to major acute cardio-vascular events (MACE) rate and dynamics of echocardiographic indices at a distance of 6 months.

2. Evaluation of the particularities of coronary involvement (anatomical pattern, plaque structure, presence of thrombus, length of lesion, degree of stenosis, etc.) and their influence on the outcome of reperfusion and post-procedural prognosis at 6-month intervals.

3. Studying the influence of the technical aspects of percutaneous revascularization on the reperfusion and evolutionary outcomes.

4. The impact of type 2 diabetes mellitus followed on the 6-month post-procedural surveillance on NSTEMI patients with intermediate and low risk supposed to revascularization.

5. Development of an clinical refrerence points and anatomical and morphological specificity of coronary injuries based algorithm to optimize the interventional approach of NSTEMI patients with intermediate and low risk based on the clinical benchmarks and the.

The scientific novelty and originality: The present study provided additional evidence that destabilized coronary atherosclerotic plaque requires a different interventional approach at each stage of its pathogenesis. Both the approach timing and the used technique during the intervention are important. There were elucidated the factors influencing the prognosis of patients with acute myocardial infarction without ST-segment elevation classified in the intermediate and minor risk groups who underwent coronary angioplasty.

The theoretical importance. There were studied: the coronary arteries anatomy, atherosclerotic plaque structure, the degree of coronary lesion, the intracoronary physiology in patients with acute myocardial infarction without ST-segment elevation. The techniques used in the interventional approach of these patients were analyzed. It was compared the effectiveness of certain interventional techniques for approaching the ulcerated plaque by angiographic assessment of the distal coronary flow at the end of the intervention. It was proven the impact of distal embolization during stenting and unstable platelets with thrombotic component related to the recovery of the affected myocardium and the remodeling of the left ventricle in the medium term. There were studied the peculiarities of the left ventricular systolic function after percutaneous myocardial revascularization in patients with type 2 diabetes mellitus who have developed acute myocardial infarction without ST-segment elevation and are part of the intermediate risk group.

The applicable value of the work. It was developed a strategies for a special clinical conditions, such as acute myocardial infarction without elevation of the ST segment, with intermediate and minor risk, in order to optimally manage by cardiologists these large groups of patients. The optimal “time window” for myocardial revascularization was identified for these patients. It was stipulated a recommendations on the techniques used in the interventional approach to vulnerable plaque. The importance of diagnosing diabetes mellitus, monitoring and adequate correcting of blood glucose in patients with acute myocardial infarction without elevating the ST segment, who are exposed to percutaneous myocardial revascularization, has been considered.

Practical implementation. The materials obtained during the research were applied in the daily activity of the Department of Interventional Cardiology of "Institute of Cardiology" and the University Clinic of Interventional Cardiology, in courses at the Department of Cardiology, Department of Internal Diseases of the State University of Medicine and Pharmacy “Nicolae Testemițanu”. To note that the eese4ntial concepts was used in the elaboration of the 2017 National Clinical Protocol “Acute myocardial infarction”.

2. MATERIAL AND RESEARCH METHODS

The study was approved by the Research Ethics Committee of a State University of medince and Pharmacy "Nicolae Testemițanu", after being examined at the meeting of May 30, 2016, with the issuance of favorable opinion no. 58 of 03.06.2016.

In this study was included a total of 252 patients who suffered an acute myocardial infarction without ST-segment elevation in the last 30 days, a condition for which they was supposed to angioplasty and who met the GRACE score (Global Registry of Acute Coronary Events) and the criteria proposed by European Society of Cardiology in intermediate and low risk groups. Included subjects were admitted between January 2017 and December 2018 at "Institute of Cardiology" and NOVAMED Multipurpose Hospital.

Study inclusion criteria:

- Acute myocardial infarction without ST segment elevation;
- Intermediate or low ischemic risk assigned;
- Percutaneous myocardial revascularization applied in the therapeutic interval of 0-72 hours or after 72 hours - 30 days from the onset of symptoms.

Study exclusion criteria:

- Very high and high cardiovascular risk;
- Previously supported myocardial infarction;
- Dilated cardiomyopathy;
- Post-inflammatory cardiomyopathy;
- Hypertrophic cardiomyopathy;
- Coronary stenosis that caused the infarction <50% and FFR> 0.80;
- Presence of > 75% stenosis on the vessels other than consided culprit of acute myocardial infarction;
- Aorto-coronary bypass or coronary plasty in the anamnesis;
- Significant valvulopathies (grade III-IV insufficiency, medium and severe stenoses);
- Diffuse hypokinesia of the left ventricle on echocardiography;
- Advanced kidney failure.

It was selected and completed two groups of 126 patients each: first group (control) included patients undergoing myocardial revascularization by angioplasty in the first 72 hours after the onset of symptoms and second group (study group) - patients who were treated by angioplasty within 72 hours - 30 days from the disease onset. This randomization was performed in order to research on the level of the first two investigative objectives.

According to objectives two and three, both of gruops (I and II) were divided into subgroups according to the evolution of the ejection fraction (EF) in the first days after revascularization and six months after the intervention. Subgroups of the group I: subgroup I-1 with 71 patients, in which the ejection fraction increased by 2% or less and subgroup I-2 - 55 patients in which the EF increased by more than 2 months six months %. The sublots in group II were distributed as follows: sublot II-1 with 64 patients with an increase in ejection fraction of 4% or less and sublot II-2 with 62 patients, in which the increase in EF was over 4% .

In order of influence of revascularization time exclusion, the general group was also subdivided according to the evolution of the left ventricular ejection fraction into two subroups: the G-1 subgroup, which included 129 patients, in whom EF increased with 3% by six months or less (including two patients who died during the evaluation), and the G-2 subgroup that included 121 patients in whom the EF increased by more than 3%.

Diabetes mellitus (DM) is a potent risk factor, which influences the development and evolution of heart diseasees, especially ischemic heart disease. That's why a group of 59 patients with acute myocardial infarction without ST-segment elevation who also suffered from DM was separated.

The clinical evolution of these patients was compared with the group of 193 non-diabetic patients. In both subgroups the following aspects were analyzed: coronary anatomy, degree of atherosclerotic lesion, characteristics of lesions that caused the coronary event, technical features related to percutaneous myocardial revascularization, angiographical outcome of the coronary intervention, the rate of complications, patient's clinical state after reperfusion, hospitalization time and the mid- term petient's evolution.

The design of the research initiated by us is shown schematically in figure 1.1.

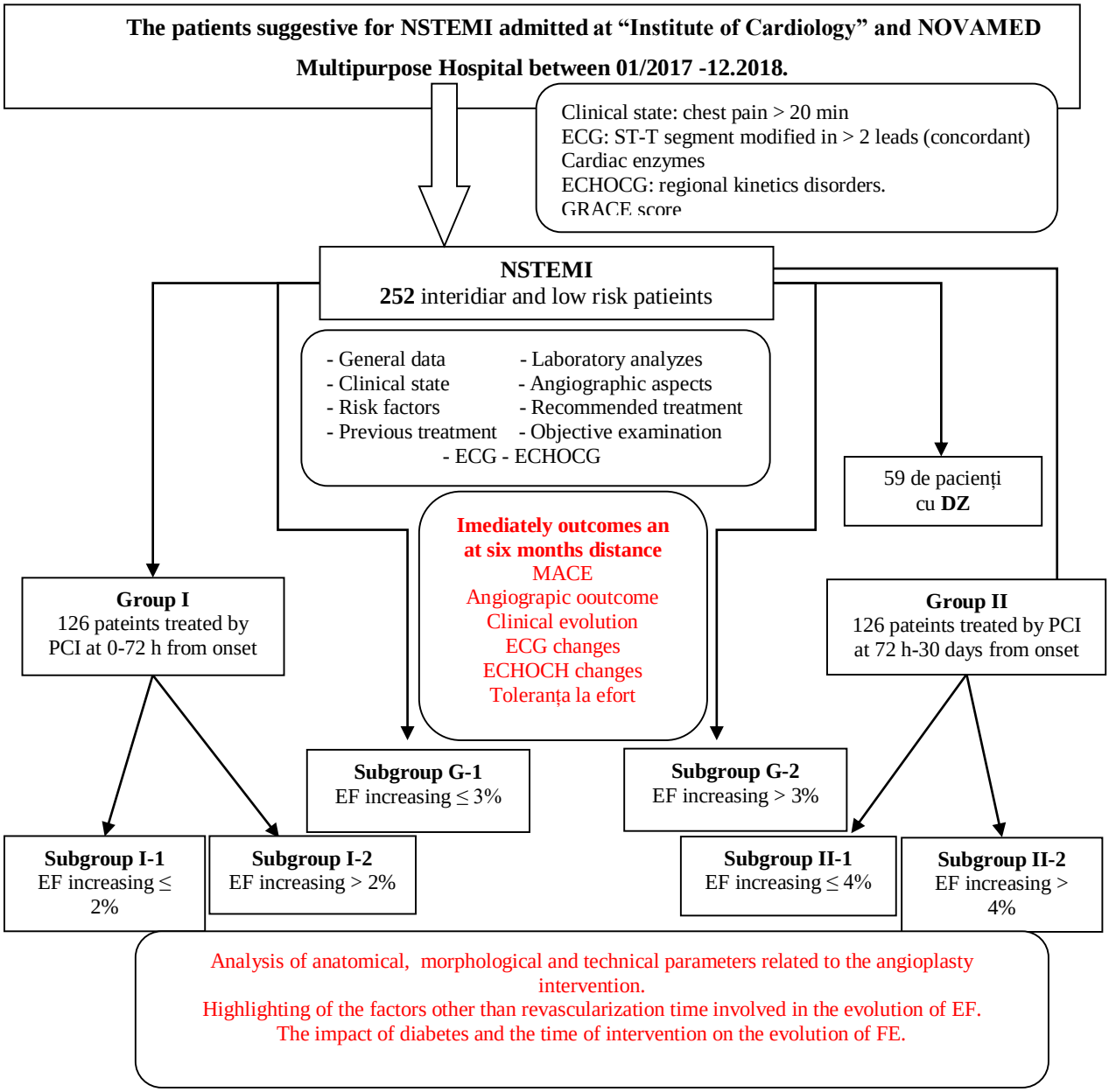

Figure 1.1. **Research design**

2.1. Research methods used in the study.

Subjects included in the study passed through a complex clinical, paraclinical and instrumental examination. Initially, each participant was interviewed, entering the data collected in a questionnaire developed for research. The questionnaire included questions regarding general data about the patient: age, demographic data, presence of risk factors, administration of antihypertensive treatment, hypoglycemic, hypolipemic, etc., age of hypertension or diabetes.

Then they all performed the clinical examination. The anthropometric parameters evaluated were: waist, body mass, and body mass index (BMI). Laboratory analyzes performed by all participants in the study included: blood count, basal blood glucose, urea, creatinine, lipid profile, cardiac necrosis enzymes, liver function samples (transainases). Non-invasive instrumental evaluations applied to all study participants included: ECG, transthoracic 2D EchoCG – at the second day after the intervention and at 6 months of monitoring, exercise stress test - at 6 months after the postprocedural. Invasive instrumental investigations included angiographic examination and, selectively, intracoronary diagnostic methods were applied: fractional flow reserve (FFR) and optical coherence tomography (OCT).

The statistical processing of the results was performed through EpiINFO software programs, specialized in scientific statistical calculations.

3. STUDY OUTCOMES

3.1 Clinical feature and analysis of risk factors in selected patients undergoing percutaneous myocardial revascularization

There were comparatively evaluated the demographic, anamnestic, hemodynamic parameters and risk factors present in the patients from both study groups,. No statistically significant differences between groups according to demographic and anamnestic data of the patients investigated were noticed. The spectrum of risk factors of the patients in the study was relatively uniform. Statistical differences were determined only for the values of hypertension and alcohol consumption.

Relative to previous administred treatment it were analyzed the rate of medication presented by the main medicine groups: beta-blockers, converting enzyme inhibitors (IECs), angiotensin receptor inhibitors (IRAs), long-term action nitrates, calcium channel blockers, antiplatelet drugs, diuretics, oral anticoagulants, and statins. Statistical differences were observed only between patients administering beta-blockers. Treatment with this drugs was followed more often by patients in the research group: 50 (39.7%) vs. 31 (24.6%); ($p < 0.05$).

3.2. Results of evaluation by non-invasive instrumental diagnostic methods and laboratory investigations in patients undergoing myocardial revascularization for acute myocardial infarction without ST segment elevation.

The electrocardiogram (ECG) performed at admision revealed a sinus rhythm in 235 (93.3%) patients in the general group (121 (96.0%) vs. 114 (90.5%); atrial fibrillation was

diagnosed at 16 (6.3%) patients (4 (3.2%) vs. 12 (9.5%). One patient (0.8%) in the control group had I degree atrioventricular block (p> 0.05).

The analyze of laboratory investigations results highlighted several peculiarities: high levels of cardiac enzymes were more frequent in patients in the control group, which is explained by the persistence of biomarkers in the blood after necrosis; the patients who addressed themselves late had already normalized levels of myocardial necrosis enzymes.

Qualitative troponin was strong positive in 138 (54.8%) patients in the general group (93 (73.8%) vs. 45 (35.7%)), weakly positive in 14 (5.6%) patients in the general group (5 (4.0%) vs. 9 (7.1%)) (p <0.001). Quantitative troponin was determined to be present in 44 patients (36 in the control group and 8 in the research group) and was 15,107 ± 2,345 ng / l (16,246 ± 2,667 vs. 9,980 ± 4,609) (p> 0.05). The MB fraction of creatinine phophokinase also had a higher level in the group of patients undergoing immediate revascularization and was estimated to average 60,847 ± 5,980 U / l (83,234 ± 10,790 vs. 38,459 ± 4,375 U / l) (p <0.001).

Biochemical blood tests parameters were mostly of comparable levels, in both groups being slightly deviated at some positions. The mean blood glucose index was insignificantly higher in group I patients and was 6.856 ± 0.208 mmol / l (7.317 ± 0.332 vs. 6.393 ± 0.247 mmol / l); (p <0.05). The lipidogram (CT, TG, HDL), performed in both groups, did not reveal statistically significant differences (p> 0.05), except for the level of LDL cholesterol, which was higher in the control group - 3,230 ± 0.108 vs. 2,891 ± 0.094 mmol / l (p <0.05).

3.3 Coronary arteries anatomy and characteristics of atherosclerotic lesion evaluated by invasive diagnostic methods in patients with acute myocardial infarction without elevation of the ST segment with intermediate and low risk.

Invasive coronary angiography was the basic method for visualizing and analyzing the coronary bed, examining the anatomy of the coronary arteries and estimating their degree of atherosclerotic damage.

According to obtained data, the most often so-called “culprit” lesion (atheroma plaque considered the cause of the development of acute coronary syndrome) was located on the anterior descending artery (LAD). The proximal segment of LAD was affected in 68 (27%) patients in the general group (43 (34.1%) vs. 25 (19.8%)), the middle segment - in 69 (27.4%) of the total patients (30 (23.8%) vs. 39 (31.0%). One patient (0.4%) was diagnosed with ulcerated plaque on the left main coronary artery – which led to revascularization in the first 72 hours after the onset of anginal pain. The statistically significant diferences between both groups related to

culprit lesion was not noticed (p>0,05).

Instead, there are statistically important differences for the severity of the stenosis caused by the "culprit" injury. In the control group, the complete occlusion of the vessel was more incident - 77 (61.1%) vs. 50 (39.7%) patients in the research group. This difference can be explained by two mechanisms: the first one is related to the adveance degree of stenosis, especially coronary occlusion, which in many cases have more pronounced clinical signs and force the patient to go earlier for medical care; the second one mechanism is related to treatment, especially the antiplatelet and anticoagulant, indicated to patients by primary care until hospitalization, which in some cases was the cause of of coronary occlusions recanalization. Criti\cal stenoses (90-99%) were diagnosed in a total of 96 (38.1%) patients (38 (30.2%) vs. 58 (46.0%)). In 23 participants (9.1%) stenosis graded in the range of 75-90% was estimated as severe stenosis (7 (5.6%) vs. 16 (12.7%)). Six patients (2.4%) of all those in the study had moderate (25-50%) and moderate-severe (50-75%) stenoses; (p <0.01).

Especially in patients with severe, critical coronary stenosis and complete occlusions reloading index of the distal segments was also analyzed. The reload was visible angiographically to varying degrees in 136 (65.7%) patients in the general group (65 (60.2%) vs. 71 (71.7%); (p> 0.05). Intrasystemic collateralization was present in 40 (24.8%) patients (19 (25.0%) vs. 21 (24.7%)), extrasystemic - in 36 patients in the general group (22 (28.9%) vs. 14 (16.5%)), mixed (intra- and extrasystemic) - to 20 (9 (11.8%) vs. 11 (12.9%). 7%) of patients found the phenomenon of anterograde reloading of the distal segments by partially recanalized occlusion (37 (48.7%) vs. 43 (50.6%); (p> 0.05).) Most of the target lesions were of average length (16-25 mm), found in total in 141 (56%) patients in the general group (71 (56.3%) vs 70 (55.6%). A short lesion (0-15 mm) had caused acute coronary syndrome in 72 (26%) patients (33 (26.2%) vs. 39 (31.0%). Long atherosclerotic plaques (26-40 mm) were found in 32 (12.7%) patients (17 (13.5%) vs. 15 (11.9%). Rarely, only in 7 (2.8%) of the total subjects studied, a very long lesion was estimated (> 40 mm); (p> 0.05)

3.4. Technical conditions of percutaneous myocardial revascularization applied at different stages of evolution of acute myocardial infarction without ST-segment elevation

In all patients, myocardial revascularization was performed in course of the same intervention as a result of coronary angiography. Of the control group, 72 (57.1%) patients underwent revascularization in the first 12 hours after the onset of acute pain, in 36 (14.3%) patients the reperfusion time was 12-24 hours, in 11 (4.4%) patients - 25-48 hours, and 7 (2.8%)

patients were revascularized 49-72 hours after onset. In the research group, the majority of patients (90 (71.4%) underwent intervention within 72 hours - 14 days after the infarction, the other 36 (28.6%) patients received revascularization at 15-30 days.

Mechanical thrombaspiration was more often used in patients of the control group. In 54 (42.9%) patients of the group I thrombaspiration had a positive effect, in 10 (7.9%) patients it was useless. In group II there were attempts to use thrombaspiration in revascularized patients in the first 4-5 days, in 27 (21.4%) patients it was successful, and in 6 (4.8%) patients it proved useless ($p < 0.001$). The rate of patients with metal prostheses - BMS was higher in group I - 32 (25.4%) vs. 6 (4.8%) in the research group. Drug eluting stents (DES) was implanted in 212 (84.1%) patients from the general group (93 (73.8%) vs. 119 (94.4%). Because the atherosclerotic substrate being absent in one patients from control group, he did not received any stent - that intervention was limited to ballon dilatation procedure, and in another patient from group II was mounted a biodegradable carcass ($p <0.001$).

Mostly, were implantet stents manufactured by four companies: Boston Scientific (USA) - 79 (31.5%) patients in the general group (35 (28.0%) vs. 44 (34.9%); Medical (India) - 77 (30.7%) patients (46 (36.8%) vs. 31 (24.6%); Medtronic (USA) - 48 (19.1%) subjects (27 (21)), 6%) vs. 21 (16.7%)) and Abbot (USA) - 21 (8.4%) total patients (13 (10.4%) vs. 8 (6.3%). The rate of the other three companies is lower: Terumo (Japan) was implanted in 18 (7.2%) patients in the general group (3 (2.4%) vs. 15 (11.9%));) - at 7 (1 (0.8%) vs. 6 (4.8%)) and only one patient from group II received the “Supaflex” stent of SMT (India) ($p <0.01$).

Higher stent expansion pressures were used in group II patients because of the presumed lower risk of distal embolization in stabilized plaques. Low pressures of 10-14 atm. were applied to 162 (64.5%) patients (91 (72.8%) from group I vs. 71 (56.3%) from group II), the average ones (15-18 atm.) - in total at 68 (27.1%) patients (29 (23.2%) vs. 39 (31s,%)) and at high pressures (18-24 atm.) the mounted stents expanded to 21 (8, 4%) of patients in the general group (5 (4.0%) vs. 16 (12.7%); ($p <0.01$). 9%) of cases in group I vs. 37 (29.4%) of patients in group II) ($p <0.05$). present in the control group (59 (46.8%) vs. 11 (8.7%) in the study group - a total of 70 (27.8%) subjects in the general group ($p <0.001$).

Comparative assessment of both groups related to final coronary flow resulting after angioplasty (according to TIMI criteria) is presented in Figure 3.1

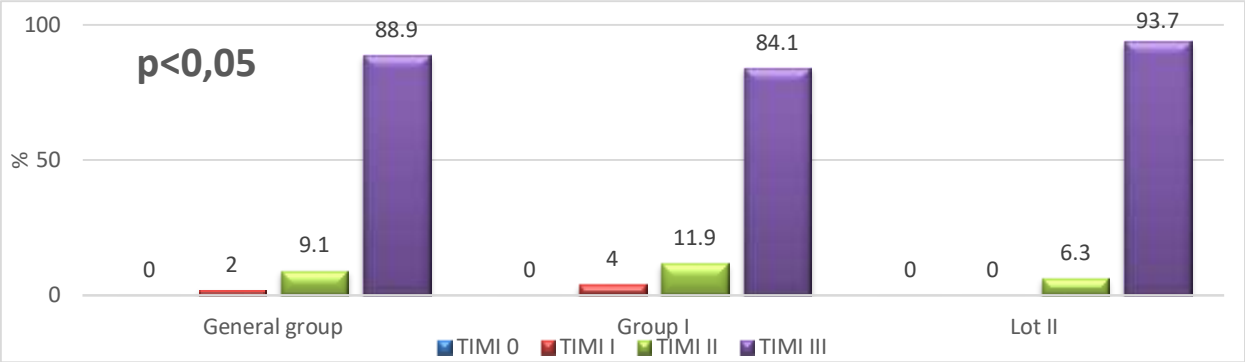

Figure 3.1. **After angioplastyTIMI coronary flow assesment**

It is observed that patients undergoing delayed revascularization had TIMI III flow in higher proportion than those immediately revascularized (106 (84.1%) patients in group I vs. 118 (93.7%) in group II). TIMI II distal flow was attested in 23 (9.1%) patients, 15 (11.9%) of whom were from group I and only 8 (6.3%) from group II. In a patients with revascularization performed later than 72 hours it was not registered TIMI I and TIMI II flow, meanwhile 5 (4.0%) patients had TIMI I final flow in group I ($p < 0.05$).

The degrees of myocardial blush obtained as a result of myocardial revascularization are shown in Figure 3.2. At this parameter the differences become even more obvious. With myocardial blush 3, a total of 147 (58.3%) subjects underwent revascularization, of which 92 (73%) had been revascularized after 72 hours and only 55 (43.7%) had been revascularized in the first 72 hours. The decrease in myocardial blush at grade 2 was observed in a total of 67 (26.6%) patients (37 (29.4%) in group I vs. 30 (23.8%) in group II). Complete absence or grade 1 myocardial blush was recorded in group II in only 4 (3.2%) patients, while in group I 21 (16.7%) patients had grade 1 and 13 myocardial blush angoplasty. (10.3%) - grade 0 ($p < 0.001$).

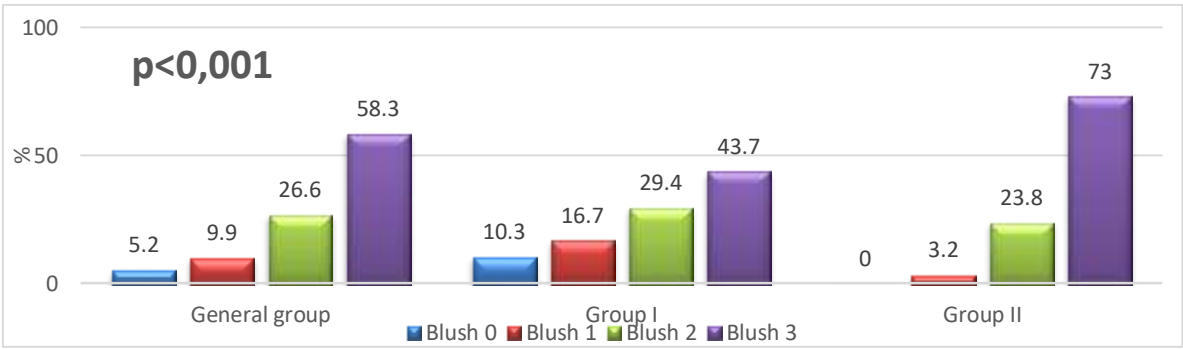

Figure 3.2. **After PCI coronary flow assesment according to "blush" degree**

Local complications such as haematoma at the puncture site produced a total of 8 (3.2%)

patients and all were from group I. In group II such complications were not recorded ($p < 0.05$).

A higher volume of contrast agent was used during the emergency interventions than in the case of delayed interventions. In the general group, an average volume of 182,512 ± 3,021 ml of contrast medium (194,206 ± 4,626 vs. 170,817 ± 3,616ml) was used; ($p < 0.001$). Contrast-induced nephropathy developed in 4 (3.2%) patients in group I, which was curbed by the application of forced diuresis and did not require hemodialysis ($p < 0.05$).

The level of irradiation was measured by the cumulative number of exposures during coronary angiography and angioplasty. And for this parameter, statistically significant differences are observed to the detriment of immediate revascularization. The average number of radiological acquisitions in the general group was 17,587 ± 0.368 (18,413 ± 0.587 vs. 16,762 ± 0.435); ($p < 0.05$).The clinical condition of the patients was assessed at the end of the intervention depending on the presence of anginal complaints. Patients undergoing emergency revascularization (within the first 72 hours) more often reported such symptoms: 59 (46.8%) patients in group I vs. 14 (11.1%) from lot II. ($p < 0.001$).

Patients in the control group also had a longer average hospitalization time - 7,151 ± 0.246 vs. 6,270 ± 0.327 days ($p < 0.05$). The average length of hospital stay in the general group was 6.710 ± 0.206 days.

3.5 Medium-term clinical and paraclinical evolution of patients with acute myocardial infarction without ST increase who had immediate and delayed revascularization.

During the evaluation within the control group, 2 deaths occurred, which constituted 1.6%. One patient died during hospitalization from a malignant ventricular arrhythmia, and the second died suddenly 3 months after revascularization. In the research group, mortality was 0% ($p > 0.05$).

A total of 4 (1.6%) patients in the general group supported repeated myocardial infarction. All of these cases occured in patients who had undergone immediate revascularization. Three patients (2.4%) in group I developed repeated myocardial infarction in the same area, and in 1 (0.8%) patients in group I, myocardial infarction occurred in a different area than the initial one ($p > 0.05$).

Repeated myocardial infarction supported a total of 4 (1.6%) patients in the general group. All of these cases were reported in patients who had undergone immediate revascularization.

Three patients (2.4%) in group I developed repeated myocardial infarction in the same area, and in 1 (0.8%) patients in group I MI occurred in a different area than the initial one (p> 0.05).

The recurrence of anginous signs was present in patients in both groups, but in the research group fewer patients invoked these sensations. In total, clinical similarities of angina pectoris were registered in 54 (21.6%) patients in the general group (46 (37.1%) vs. 8 (6.3%); (p> 0.001).

In all 7 (2.8%) patients in the general group, who during clinical follow-up required repeated revascularization, the intervention was performed immediately during acute myocardial infarction. Repeated PCI was prformed in 6 patients, and one patient required coronary artery bypass graft (p <0.05). This can be partly explained by the higher rate of bare metal stents (BMS) implanted in patients in the control group. The incidence of intrastent restenosis in BMS is significantly higher than in in case of drug-eluting stents (14.84 vs. 4.68%).

The severity of heart failure present in patients in both groups at six months after percutaneous myocardial revascularization is shown in Figure 3.3.

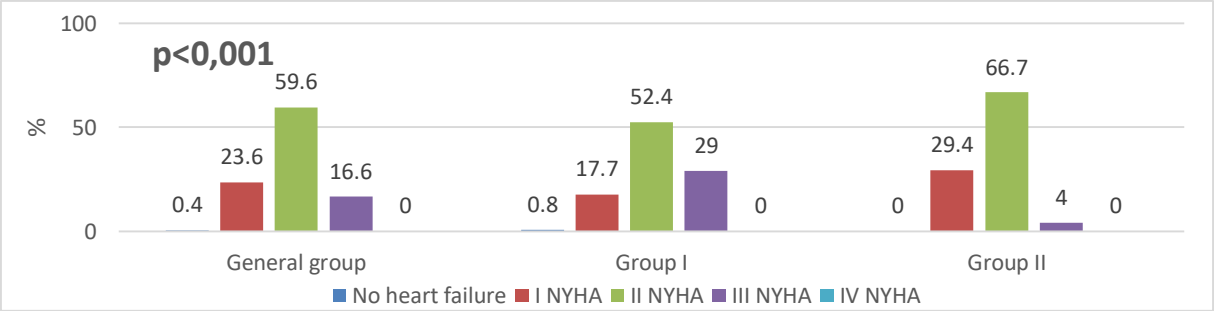

Figure 3.3 **Heart failure occurence estimated at six monts after myocardial revascularization**

There is a higher rate of patients with advanced degrees of heart failure (HF) in the control group, compared to the research group. In total, class II INYHA of HF was diagnosed in 41 (16.4%) patients in the general group - 36 (29.0%) vs. 5 (4.0%). Class II NYHA had 149 (59.6%) patients in total, of which 65 (52.4%) were from group I and 84 (66.7%) from group II. Class I NYHA was diagnosed in 59 (23.6%) patients in the general group (22 (17.7%) vs. 37 (29.4%). 1 (0.8%) patient in the control group showed no signs of heart failure (p <0.001).

The echocardiographic dynamics during the six months of evidence after percutaneous myocardial revascularization is presented in table 3.1.

Tabel 3.1. **Echocardiograpfic dynamics at six months after PCI**

Estimated parameter	Group I (n=126)			Group II (n=126)			P
	M	m	P	M	m	P	
Δ Ao asc., mm	+0,637	0,142	<0.001	+0,333	0,117	<0.01	>0.05
Δ AS, mm	+0,484	0,191	<0.05	-0,341	0,136	<0.05	<0.01
Δ DTD VS, mm	+1,097	0,210	<0.001	+1,103	0,434	<0.05	>0.05
Δ VTD VS, ml	+2,742	1,028	<0.01	+0,944	1,128	>0.05	>0.05
Δ DTS VS, mm	+0,508	0,302	>0.05	-1,960	0,243	<0.001	<0.001
Δ VTS VS, ml	+1,048	1,080	>0.05	-5,556	0,615	<0.001	<0.001
Δ SIV, mm	-0,121	0,09	>0.05	-0,159	0,05	<0.01	>0.05
Δ PPVS, mm	-0,085	0,06	>0.05	+0,071	0,05	>0.05	>0.05
Δ EF, %	+1,734	0,58	<0.01	+5,238	0,36	<0.001	<0.001
Δ VD, mm	-0,177	0,18	>0.05	-0,683	0,23	<0.01	>0.05
Δ AD, mm	+0,637	0,24	<0.01	-0,175	0,19	>0.05	<0.01
Δ PSAP, mm Hg	-7,113	0,65	<0.001	-9,873	0,48	<0.001	<0.01
Δ Hypokinezia zones	+1,135	0,12	<0.001	+1,397	0,12	<0.001	>0.05
Δ Akinezia zones	-0,095	0,1	>0.05	+0,159	0,07	<0.05	<0.05
Δ Dyskinezia zones	-0,325	0,09	<0.001	-0,04	0,04	>0.05	<0.01
Δ Aneurysm zones	-0,294	0,08	<0.001	-0,048	0,05	>0.05	<0.01

N.B. : Δ – difference between estimated parameter at six months and its initial value.

Ejection fraction restoration was more significant in the research group, where this parameter increased by 5.238 ± 036%, while the restoration in the control group was more modest – EF increased only by 1.734 ± 058% (p <0.001). It is important to note that angioplasty was favorable in both groups and defined the positive remodeling of the left ventricle with the increase of the overall ejection fraction. In the general group this parameter increased on average by 3.5 ± 0.36% during six months of surveillance.

The increase in EF occurred largely due to the evolution of left ventricle (LV) end-systolic (DTS) parameters. The mean DTS decreased in the general group by 0.736 ± 0.208 mm. In study group patients the end-dyastolic (DTD) of the LV decreased on average by 1.960 ± 0.243 mm, while in patients undergoing immediate revascularization this index increased by 0.508 ± 0.303 mm (p <0.001). Symmilarily was the evolution of the LV end-systolic volume (VTS), which in the general group decreased on average by 2,280 ± 0.652 ml. In patients in group I there was an increase in VTS of the LV on average by 1.048 ± 1.08 ml, and in group II conversely - there was a considerable decrease - by 5.556 ± 0.615 ml (p <0.001).

By regional kinetics analyze, we notice that the positive remodeling is produced both at the areas that were initially akinetic or with different degrees of dyskinesia (which on evaluation more than six months after revascularization were presented as hypokinetic), and at the areas of

hypokinesia that returned to normal kinetics later. The number of patients in whom no regional kinetics disorders were observed increased at the time of echocardiography performed after six months. If on the first day after revascularization the number of these patients in the general group was 32 - 14 (11.1%) and 18 (14.3%), respectively ($p > 0.05$), then at six months after revascularization they were 79 (31 (25.0%) vs. 48 (38.1%) ($p < 0.05$).

The number of areas of hypokinesia in the general group increased on average by 1,266 ± 0.09 (+ 1,135 ± 0.120 vs. + 1,397 ± 0.120 areas in the research group) ($p > 0.05$).

For the areas described as akinetic in the general group, no significant dynamics is attested (+ 0.032 ± 0.06 areas) ($p > 0.05$). In the research group the akinetic areas multiplied by 0.159 ± 0.07 areas ($p < 0.05$), and in group I there is no change in the volume of the akinetic myocardium (-0.095 ± 0.1 areas ($p > 0, 05$); ($p < 0.05$).

Myocardial revascularization contributed to the diminuishing of the dyskinesia area by decreasing it in patients in general group by an average of 0.183 ± 0.05. In the research group this area remained practically unchanged (-0.04 ± 0.04 areas ($p > 0.05$)), while in the control group it decreased by 0.325 ± 0.09 areas ($p < 0.01$).

The number of areas involved in the formation of the LV aneurysm was reduced in patients in the general group by an average of 0.171 ± 0.05 areas. This dynamic was mainly due to the immediate revascularized patients, in which the number of areas involved in the aneurysm was reduced by an average of 0.294 ± 0.08, since in patients in group II for this parameter no evolution is observed (-0.048 ± 0 .05 zone ($p > 0.05$).

The results of the exercise test performed at 6 months after percutaneous myocardial revascularization were the following:

For various reasons, the exercise test could not be performed in 6 patients (2.4% of the general group), 5 (4.0%) one of them being from group I and another (0.8%) from group II ($p > 0.05$).

In the general group, the intensity of the maximum effort performed was 105,430 ± 1,710 Wt, significantly higher values being attested in the patients from the research group - 111,200 ± 2,244 Wt vs. 99,370 ± 2,487 Wt in the control group ($p < 0.001$).

The total effort time was also longer in the group of patients with delayed revascularization - 9.448 ± 0.205min vs. 8.319 ± 0.234 min in the control group. The mean effort time in the general group was 8.898 ± 0.159 min ($p < 0.001$).

At the time of the maximum level of effort there ws not a difference between hemodynamics parameters in the researched groups. The average systolic blood pressure (SBP)

in the general group was 187,705 ± 1,120 mmHg, the average dyastolic blood pressure (DBP) was 101,631 ± 0.771 mmHg, the average hreat rate (HR) in the general group pateints reached 134,377 ± 1,379 bpm. The submaximal level of HR (85% of the maximum age-related HR) was reached in a total of 194 (79.5%) patients in the general group (82 (68.9%) vs. 112 (89.6%); p <0.001).

The exercise test was interpreted as positive in 8 (3.3%) patients in the general group (7 (5.9%) vs. 1 (0.8%) in group II); negative test was assessed in 192 (78.7%) patients in the general group (80 (67.2%) vs. 112 (89.6%), inconclusive test had 43 (17.6%) patients (31 (26.1%) vs. 12 (9.6%)); in 1 (0.8%) patient in the control group the exercise test was assessed as doubtful (p <0.001).

The exercise tolerance was clearly superior in the subjects enrolled in group II. Low tolerance presented 30 (12.3%) patients in the general group (23 (19.3%) vs. 7 (5.6%), average tolerance had 119 (48.8%) patients in the general group (58 (48.7%) vs. 61 (48.8%) and high tolerance presented 38 (31.9%) patients in group I and 57 (45.6%) in group II, a total of 95 (38) .9%) of patients (p <0.01).

3.6. Highlighting factors other than reperfusion time that influence the prognosis of patients with acute myocardial infarction without ST-segment elevation.

Patients consideres less positively (exercise test assesment) before developing myocardial infarction presented more frequently signsof unstable angina pectoris. Clinical signs of resting angina pectoris were present in 61 (46.6%) patients in the G-1 group, since among patients with a more favorable pre-infarction dynamics their number was lower - 46 (38.0%); (p <0.05). This trend is maintained in the group of patients undergoing delayed revascularization (p <0.05), but not in group I, where it was practically absent (p> 0.05).

The following particularities were noticed by analyzing the **risk factors** present in the research patients:

Arterial hypertension was equally present in both patients with more favorable dynamics and those with modest echocardiographic dynamics (p> 0.05). Statistically significant differences are attested in the group of patients who had undergone intervention after the 72-hour period, among which those with less favorable dynamics also had more advanced degrees of hypertension, and another 25% of patients did not have high blood pressure vs. 17.7% in sublot II-2 (p <0.05).

At admission, blood pressure were measured in patients with less favorable dynamics and it was found to be higher in this gruop. The mean SBP in the G-2 group was 132.115 ± 1,703

mmHg vs. 137.668 ± 1.986 mmHg in group G-1 (p <0.05). The mean DBP was also higher in the group with less favorable dynamics (80.222 ± 0.934 vs. 83.314 ± 1.181mmHg); (p <0.05). This difference between the control and research groups is maintained only in for DBP parameter, where it is equally higher in patients who followed a less favorable dynamic (80,234 ± 1,053 vs. 84,774 ± 1,814mmHg); (p <0.05).

It was not felt the influence of diabetes on the evolution of the ejection fraction of the left ventricle. The incidence of diabetes mellitus was comparable in subgroups: 26 (19.8%) of the G-1 group of patients vs. 33 (27.3%) patients in the G-2 group (p> 0.05). Analyzing groups I and II, the influence of this risk factor on the dynamics of EF was also not proven. There was a longer history of diabetes in patients in the delayed revascularized group who has a less favorable evolution. The mean precense timp of diabetes in subgroup 2-1 was 9.556 ± 1,692 years vs. 5,214 ± 1,090 years in those in subgroup 2-2 (p <0.05). In group I, higher blood glucose values were observed in patients with unfavorable dynamics (on average 8,150 ± 0.525 mmol / l) than in those in subgroup I-2 (average 6.241 ± 0.290 mmol / l); (p <0.01).

Dyslipidemia was present in 56 (42.7%) patients in the G-1 subgroup vs. 60 (49.6%) of those with more favorable dynamics (p> 0.05). There are no differences between subgroups and main groups I and II. In contrast, among patients with dyslipidemia in group I, a longer duration of this pathology was attested in patients in subgroup I-1, who also underwent a less favorable echocardiographic dynamics - an average age of 6.625 ± 0.627 years vs. 4,190 ± 0.394 years in those in subgroup 1-2 (p <0.01).

From the data analysis, the clear influence of alcohol consumption on the evolution of LV function was observed. The rate of patients who consumed alcohol more often than once a week was higher among those who performed less favorably: 27 (20.7%) patients in the G-1 vs. 11 (9.1%) patients in the G-2 group (p <0.05). The influence of this risk factor is independent of revascularization time.It is important to mention that patients who systematically administered treatments with beta-blockers before developing acute coronary syndrome followed a more favorable echocardiographic evolution. In the G-1 subgroup 36 (27.4%) of patients received beta-blockers, in the G-2 subgroup their number was slightly higher - 45 (37.2%). This trend is emerging regardless of revascularization time.

Analyzing the reperfusion time in relation to the evolution of EF, a series of important moments were delimited. At the level of the general group, the importance of the reperfusion time is reconfirmed: the rate of those reperfused after 72 hours from the onset of myocardial infarction is higher in the subgroup that evolved more favorably (66.8% of the G-2 subgroup),

since in the subgroup G-1 in most patients underwent immediate revascularization (65.6%) (p <0.001). Based on the analysis of group I, revascularization in the first 12 hours, at 12-24 hours, at 25-48 hours or after 49-72 hours has no impact on the evolution of the LV EF in both subgroups (I-1 and I-2) the rate of reperfusion patients in different time intervals is statistically comparable (p> 0.05). In group II, the better evolution of patients undergoing myocardial revascularization was observed in the interval of 72 hours - 14 days than of those revascularized 15-30 days after the onset of myocardial infarction. Reperfusions between 72 hours and 14 days were performed in 40 (62.5%) patients in subgroup II-1 vs. 50 (80.6%) patients in subgroup II-2, and reperfusions in the interval of 15-30 days - at 24 (37.5%) vs. 12 (19.4%) (p <0.05).

The evolution of the contractile function of LV, evaluated by echocardiographic measurement of the EF, was influenced *by the technical and anatomical-morphological aspects related to the percutaneous myocardial revascularization intervention.*

Among the patients supposed to delayed revascularization, when the "culprit lesion was on LAD I, it was observed a more favorable evolution of EF. The rate of dissected plaque position on LAD I in subgroup II-2 was 30.6% (19 patients) vs. 9.4% (6 patients) in subgroup II-1. On the other hand, the subjects who developed myocardial infarction by ulceration of the plaque positioned on the RCA more often followed a not very favorable evolution. The rate of damage to the right coronary artery was as follows: 42.2% (27 patients) were from sublot II-1 vs. 19.4% (12 patients) from sublot II-2 (p <0.05). In the general group and group I this phenomenon is not registered (p> 0.05).

Within the general group, the diameter of the stent used during percutaneous revascularization was related to the LV EF dynamic. In the subgroup G-2 were implanted more often small-caliber stents (2.25-2.75mm) - 20 (15.4%) of patients vs. 35 (28.9%), while in the case of patients with less favorable evolution, stents of average diameter (3.0-3.75 mm) - 97 (74.6%) of patients vs. 75 (62.0%) and high (4.0-5.0) - in 13 (10%) patients vs. 11 (9.1%) in the G-2 sublot (p <0.05). This regularity does not appear from the analysis of groups I and II, but there is a dependence of the final result on the type of stent expansion in group II: slow expansion was applied in 48 (75%) patients in subgroup II-1 vs. in 31 (50%) patients in subgroup II-2 (p <0.01). We therefore monitor the negative effects of slow stent expansion in patients with delayed revascularization.

One of the factors detected in the evaluation of the general group and which can serve as a predictor for the unfavorable evolution of the ejection fraction is the presence of angiographic signs of prolapse of thrombotic and atherosclerotic masses through the stent cells. This

phenomenon was observed in 46 (35.1%) patients in the G-1 vs. subgroup in 24 (19.5) patients in the G-2 subgroup ($p < 0.01$).

Another predictor highlighted in the general group is the gradation of coronary flow after revascularization depending on the obtained "myocardial blush". In the patients who later evolved more favorably, a higher grade of „myocardial blush" at the end of the procedure was onserved. Grade 3 „myocardial blush" occurred in 80 (66.1%) patients in the G-2 vs. in 67 (51.1%) subjects in group G-1 ($p < 0.01$). In the case of groups I and II, the dependence of the evolution at 6 months on the degree of myocardial blush was not observed. The assessment of the flow after TIMI did not directly influence the prognosis either at the level of the general group or at the level of groups I and II.

The presence of angina pectoris symptoms at the end of revascularization intervention also proved to be a suggestive predictor for the evolution of medium-term LV contractile function in patients with acute myocardial infarction without ST-segment elevation, regardless of reperfusion time. 47 (35.9%) patients from the G-1 vs. subgroup were registered. 26 (21.5%) patients in the G-2 subgroup who at the end of the percutaneous revascularization intervention complained angina pectoris ($p < 0.05$). Compared to groups I and II, the difference becomes even more pronounced both in the group with patients immediately revascularized and in those who underwent delayed reperfusion ($p < 0.01$).

The average volume of contrast used for myocardial revascularization in the G-1 subgroup was 186.718 ± 4.542 ml, while in the G-2 subgroup a considerably smaller volume was used - 177.959 ± 3.904ml ($p < 0.05$).

Analyzing the number of radiological exposures used, the same trend is distinguished: the average number of exposures in the G-2 sublot was 17,664 ± 0.576 vs. 17,504 ± 0.450 in sublot G1 ($p < 0.05$). These trends also apply to lots I and II.

3.7 The association of acute myocardial infarction without ST segment elevation and type 2 diabetes mellitus.

The mean blood glucose level in the group of patients with diabetes was 10.948 ± 0.601 mmol / l vs. 5,606 ± 0.077 mmol / l in the non-diabetic group ($p < 0.001$).

The reperfusion time did not differ statistically significantly between the diabetic and the non-diabetic group ($p > 0.05$)., The radial, femoral and brachial approaches were used equally ($p > 0.05$). For the anatomo-morphological characteristics of the coronary arteries differences were assessed between subgroups for the lesion's degree of calcinosis, non-diabetic patients

rarely had calcium deposits on the coronary arteries – 117 (60.6%) non-diabetic patients did not have calcinosis and from of diabetic patients only 20 (33.9%) didn't have it. Thus, the degree of calcinosis also differed substantially: mild calcification was found in 59 (30.5%) non-diabetic patients vs. 28 (47.5%) diabetic patients; moderate calcinosis - at 10 (5.2%) vs. 7 (11.9%) and severe calcinosis - in 7 (3.6%) non-diabetic patients vs. 4 (6.8%) patients with diabetes ($p < 0.01$).

Angiographic appearance of the presence of intracoronary thrombotic masses was more often detected in non-diabetic patients (93 (48.2%) vs. 12,920.3%), since patients with DM the target lesion was more often made up of atheromatosis formations ($p < 0.001$).

After analysis of the peculiarities related to the performed intervention, it was observed that in diabetic patients the angioplasty was not limited to a single stent often. An additional stent was implanted in 6 (10.2%) diabetic patients vs. in 25 (13.0%) patients without diabetes, and two additional stents were needed for 3 (5.1%) patients with diabetes ($p < 0.01$).

The clinical evolution of patients with acute myocardial infarction without ST segment elevation associated with diabetes melltirus is shown in Table 3.2.

Tabel 3.2 The clinical evolution of patients with NSTEMI associated with DM

Examined parameter		Non-diabetic patients (n=193)	Diabetic patients (n=59)	P
Death	No	192 (99,5%)	58 (98,3%)	>0.05
	Yes	1 (0,5%)	1 (1,7%)	
Reapeted MI	No	190 (99,0%)	56 (96,6%)	>0.05
	Yes	2 (1,0%)	2 (3,4%)	
Repeated revascularization	No	186 (96,9%)	57 (98,3%)	>0.05
	PCI	5 (2,6%)	1 (1,7%)	
	CABG	1 (0,5%)	0 (0%)	
Repeated angina pectoris	No	155 (80,2%	43 (72,4%)	>0.05
	Yes	38 (19,8%)	16 (27,6%)	

No differences were observed for echocardiographic evolution during the 6-months surveillance, both subgroups equally following a positive dynamic.

It were registred for some parameters some differences, which remained present both on the first day after the myocardial revascularization intervention and at six months follow-up. The diameter of the left atria was on average larger in diabetic patients (41,356 ± 0.52 mm vs. 40.114 ± 0. 3mm - on the first day after PCI and 41.362 ± 0.48 mm vs. 40.198 ± 0.27 mm - 6 months after PCI); ($p < 0.05$).

Myocardial hypertrophy has been reported more often in diabetic patients in the posterior

wall of the LV as well as in the interventricular septum (IVS). The mean IVS thickness was 11.461 ± 0.12 mm in non-diabetics vs. 12.373 ± 0.23 mm in diabetics – at the second day after PCI and 11.375 ± 0.09 mm vs. 12.069 ± 0.21 mm – at six months post PCI ($p < 0.01$). Posterior wall of the LV measured on average 10,228 ± 0.09 mm in non-diabetics vs. 10.669 ± 0.15 mm in diabetics – at the second day after PCI and 10.222 ± 0.09 mm vs. 10.655 ± 0.15 mm - 6 months after PCI ($p < 0.05$).

In diabetic patients, there was also a higher systolic pressure in the pulmonary artery than in non-diabetic patients (31.658 ± 0.46 vs. 35.983 ± 1.4mmHg - the day after PCI and 31.057 ± 0.38mmHg vs. 34.672 ± 1.17mmHg - 6 months after PCI ($p < 0.01$).

The exercise test performed 6 months after percutaneous myocardial revascularization surgery revealed a higher exercise tolerance in patients without diabetes.

SUMMARY OF THE OBTAINED RESULTS

TIMI coronary flow and assessment of myocardial 'blush' analysed after PCI demonstrated the superiority of delayed myocardial revascularization over that performed immediately in patients with acute myocardial infarction without elevated ST segment with intermediate and low risk. Delaying revascularization does not increase mortality or the risk of repeated MI in patients with NSTEMI in the intermediate and low risk groups. The more frequent recurrence of angina pectoris signs and the need for repeated revascularization were observed in patients with reperfusion performed in the first 72 hours. The echocardiographic evolution at six months was more favorable in patients undergoing delayed myocardial revascularization, which was manifested by a more marked increase in the ejection fraction, mainly due to the decrease in end-systolic volume of the left ventricle.

Patients suposed to delayed revascularization with a target lesion located on the proximal segment of the anterior descending artery follow an obviously more favorable echocardiographic evolution after the procedure than those with lesions on other segments of the coronary bed. Different techincal PCI aspect such as: mechanical thrombaspiration, predilation, length, type and number of implanted stents, final optimization by postdilation and the types of balloons used for pre- and postdilation did not influence the evolution of the contractile function of LV in the medium term, regardless of reperfusion time. Percutaneous myocardial revascularization is equally beneficial in both patients with type 2 diabetes and non-diabetic patients. The association of diabetes mellitus does not increase the rate of major cardiovascular events in the medium term and does not decrease the recovery of the LV contractile function. However, there is a more

pronounced decrease in exercise tolerance in diabetic patients compared to those without diabetes.

GENERAL CONCLUSIONS

1. Delayed revascularization (> 72 hours) of NSTEMI patients with intermediate and low risk express the benefits in reducing deaths over six months, compared with revascularization performed <72 hours (0 vs. 1.6%), as well as it demonstrated a decreased rate of anginal signs recurrence and repeated revascularization of the target coronary artery (0 vs. 2.4%).

2. In NSTEMI patients with intermediate and low risk, both revascularization performed <72 hours and >72 hours defined an adaptive remodeling of the myocardium at a distance of six months after PCI, which, according to the LV EF and end-systolic volume dynamics, was more obvious in the case of delayed intervention: EF increase (5.238 ± 0.36 vs. 1.734 ± 0.58%) and end-systooic volume decline (5.556 ± 0.615 vs. 1.048 ± 1.080 ml).

3. The impact of percutaneous myocardial revascularization on the recovery of the affected left ventricular myocardium in patients with NSTEMI is in direct correlation with the the “culprit” lesion location and, respectively, with the ischemic surface. The other anatomical and morphological factors did not influence the evolution of the patients that has undergone PCI.

4. Interventional techniques such as mechanical thrombaspiration, direct stenting, postdilation avoidance, slower stent expansion did not contribute to a more favorable evolution of the LV EF in the study patients, regardless of reperfusion time. Implantation of the latest drug-eluting stents decreases the rate of angina recurrence and repeated myocardial revascularization in patients with NSTEMI in the intermediate and low risk groups.

5. The angiographic aspect of athero-thrombotic mass proliferation through stent cells, coronary flow and compromised post-procedural myocardial blush are strong negative predictors for the evolution of the left ventricular ejection fraction. The risk of reporting such a post-angioplasty angiographic picture has been shown to be more important in early myocardial revascularization.

6. The presence of type 2 diabetes mellitus in NSTEMI patients with intermediate and low risk did not influence the MACE rate and echocardiographic dynamics, but was detrimental in order to restore tolerance to physical exertion, the effort time being depreciated by 11.6%.

7. Pacienții NSTEMI cu risc intermediar și scăzut, inclusiv cu diabet zaharat de tip

II, pot fi revascularizați la distanța de 72 de ore – 14 zile prin implantarea stenturilor farmacologice de ultimă generație, fără hazardarea ratei MACE și fără remodelări post-infarct ale miocardului la distanța de 6 luni.

8. Intermediate and low risk NSTEMI patients and thos with type 2 diabetes mellitus, can be revascularized at a distance of 72 hours - 14 days by implantation of drug-e;uting stents stents, without increasing MACE rate risk and without post-myocardial remodeling at a distance of six months.

PRACTICAL RECOMMENDATIONS

1. It is necessary to estimate the risk criterion according to the level of cardiac troponin: its elevation in dynamics must be considered as a high risk criterion. A constant level or decrease in cardiac enzymes can be interpreted as an intermediate risk criterion.

2. It is preferable to proceed to the revascularization by coronary angioplasty performed within 72 hours - 15 days after the onset of acute myocardial infarction without elevation of the ST segment if the clinical condition and the parameters of the instrumental and laboratory investigations allow it.

3. The application of different interventional techniques in patients with acute myocardial infarction without ST segment elevation should be conditioned by the anatomical-morphological state, the main goal being to minimize the risk of distal embolization, especially when the intervention is performed in the first 72 hours.

4. It is recommended to avoid oversizing the stents and in case of intermediate diameter of the vessel, a smaller diameter stent will be chosen for implantation, especially in patients with NSTEMI undergoing revascularization in the first hours after onset.

5. Because of reduced recurrence of angina pectoris and repeated revascularization in patients with NSTEMI, implantation of the latest drug-eluting (pharmacological) stents is more preferable than first-generation of DES and metal stents.

6. Assessment of blood glucose levels is important in all patients with NSTEMI, and appropriate correction of glycemic status in patients with diabetes mellitus should be applied to improve the outcome of these patients.

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LIST OF PUBLICATIONS

- **Articles published to accredited international scientific journals:**

1. **Surev A.,** Abras M., Grib A., Gheorghiu C., Popovici I. Six-month clinical follow- up of the self-apposing coronary stent system în patients with hemodynamically significant stenosis of unprotected left main. In: *Romanian Journal of Cardiology*. 2018; 2 (28): 171-173. ISSN 1220-658X, ISSN-L 1220-658X.
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- **Articles published to accredited national scientific journals:**

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3. **Surev A.** Evoluția clinică la pacienții cu infarct miocardic acut fără elevarea segmentului ST asociat cu diabet zaharat tip II supuși revascularizării miocardice percutane. In: *Buletin of the academy of sciences of Moldova. Chișinău,* 2020; 2(66): 147-149. ISSN 1857-0011.
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- **Participation with communications at scientific forums:**

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32. **Surev A.** Tratamentul intervențional al sindromului coronarian acut fără elevarea segmentului ST la pacienții din grupul de risc intermediar și mic. *Congresul VI al Societăţii Cardiologilor din Republica Moldova. Chișinău, Republica Moldova 7-8.10.2016.*
33. Popovici I., Calenici E., **Surev A.** Coronarografia – dincolo de stenozele limitate de flux. *"Actualități în cardiologie prin prisma medicinii practice", Chișinău, Republica Moldova, 16 octombrie 2014.*

✓ **international**

34. **Surev A.** FFR- and OCT-guided complete revascularisation. Prezentare de caz clinic în cadrul sesiunii "Interactive Case Corner 7". *GulfPCR-GIM 2019, Dubai,EAU, 18–19 December, 2019.*
35. **Surev A.**, Abras M., Grib A., Diaconu N. ACS with total occlusion of left main. Prezentare de caz clinic în cadrul sesiunii "Challenging cases". *AICT-AsiaPCR 2019, Singapore, 4–6 July, 2019.*
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37. **Surev A.**, Abras M., Grib A. Complete revascularization in complex multivessel coronary artery disease. Prezentare de caz clinic în cadrul sesiunii "Optimal revascularisation for multivessel disease". *EuroPCR 2019, Paris,Franța, 21–24 May, 2019.*

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SUREV ARTIOM

FEATURES OF INTERVENTIONAL TREATMENT OF ACUTE MYOCARDIAL INFARCTION WITHOUT ST SEGMENT ELEVATION

321.03 - CARDIOLOGY

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